



THE IMPRESSION OF FINISHING

Colors, Textures and Patterns

Aalto University
School of Arts, Design and Architecture
MA programme for Furniture Design
Master Thesis 2012



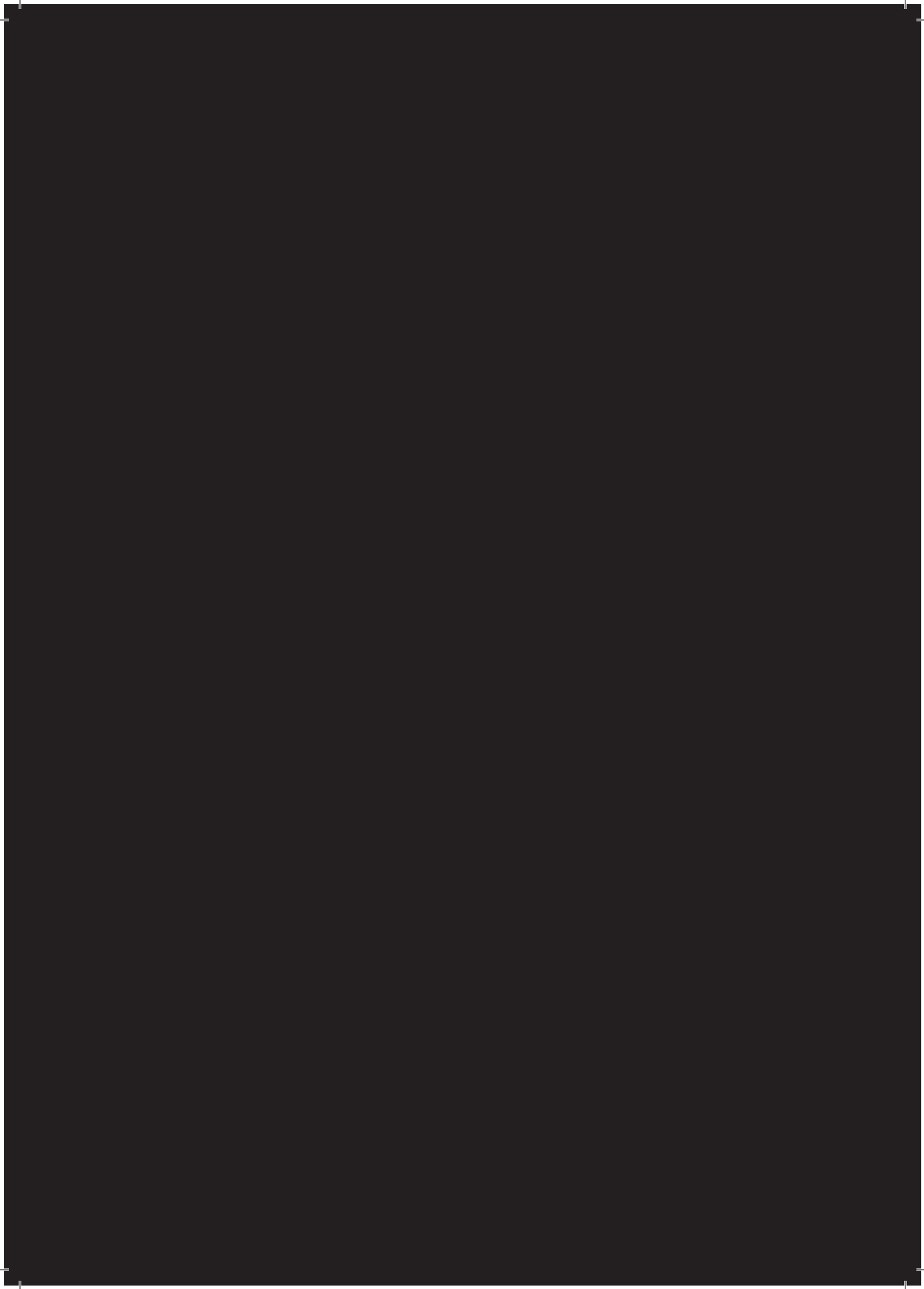




THANK YOU TO EVERYONE
WHO HAS SUPPORTED ME
FOR THE PAST 10 YEARS

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"SKIN IS THE SURFACE OF THE OBJECT. WHILE THE MATERIALS AROUND US ARE BECOMING INCREASINGLY STANDARDIZED AND FINISHES ARE BECOMING MORE AND MORE UNIFORM, WORK ON SKIN STRIKES US AS BEING OF PRIME IMPORTANCE. IT ALLOWS YOU TO INTRIGUE THE EYE, MAKING THE PERCEPTION OF AN OBJECT STRANGER THAN IT WOULD BE IF YOU WERE ABLE TO READ ITS FORM AND MATERIAL IN A SIMPLE MANNER"

- Ronan And Erwan Bouroulle.

Ronan and Erwan Bouroulle. skin. 2 nd ed.
New York : Phaidon Press Limited, 2008, p 147.

PREFACE

The major focus in my design work is always on the last step, or as it is called finishing. This process is very crucial and extremely influential in creating a successful design. The same objects with same shapes could have different finishing, in other words, different final direction both in tangible and intangible aspects. These aspects include price basis, target audience and user experience. For instance, finishing could propose a variety of end products, as we can see in the stainless steel objects, where the finishing can suggest different qualities for example finishing as hairline enhances modernity of the object, whereas mirror finish enhances sense of luxury. This depends on the aim and purpose of the object, for example, mirror-finishing stainless would be suitable for public area or outdoor area because of its shiny surface attracts people, and it is resistant to steel corrosion. Therefore, we usually see sculptures or architectural products with this type of finishing.

In a design world, we can see that furniture in the market can be classified into different categories. Most of them tend to compete on beauty, material innovation as well as function that respond to changing user behaviors. There are differences in how the finishing accentuates different materials (or something like this). For example, finishing for wooden work is prominent as wood remains wood. The design focuses on presenting wooden surface as similar to furniture that has been in the market throughout the last decades. Surface making is just only shining or dyeing to intensify the color, and it is not that differentiated or innovative. On the other hand, metal objects can take different forms but the finishes in metal objects consist of only a few suitable methods such as powder coating, anodized surface, or chromium plated. Whereas, plastic is different from other materials as its finishing process is integrated into the formation by adding pigment colors into plastic in the injection process. This is different from other types of materials since in their formation and surface-covering process are separated.

I am highly interested in metal objects due to my past experiences, which show that if we want to color metal objects in the industrial process, we need to manufacture the object completely before we can apply the color into the object in the finishing stage. If we want to design the chair from metal that is to have parts of different colors, it means we need to form different pieces separately. After that, we could proceed to the coloring process and create one chair. If one chair has a variety of colors, the effects in industrial process are complication and high production costs, since it is necessary to multiply production processes, coloring processes as well as assembly processes. This is one reason why metal objects in the

market have fewer finishing varieties as one chair normally has only one or two colors at most. If we want more than that, we need to use different materials to bring in different features. The limiting point here has inspired me to investigate and create a new finishing method in order to create new innovative perspectives, and open choices for users when they choose furniture.

In the first part of the work I will present new material for finishing and discuss the proper way to combine this material with object (Industrial craft). Finding a perfect production process is an important factor in bringing my project to the market, because after studying and experimenting with the material, I found out that if we want new ideas in finishing process, 100% industrial production process tends not to be the right direction. Lastly, the final work of this project should show the way to finished the product in the way that no other coloring process could do.



VEHICLE FILM

In winter, late 2007, I had a chance to exhibit my work in Frankfurt, Germany. While I was walking back to my hotel, I made a glance at BMW X6 which just passed by. I am not a real automobile fan, but from my experience, this car is popular among the rich in middle Europe as it is truly elegant, which is a normal style of BMW. However, what made me very excited is that this car was wholly dark 'matt' black, strong, and not luminous, giving the feeling that the car was out of some superhero movies. In spite of technology and appearance, automobile industry tends to attract users by shiny and glossy painted colors, which we are familiar with and can see anywhere on the road. Nevertheless, this particular car I saw is surprisingly not like any car in the market. I felt that it looked more aggressive than the same BMW model that I have ever seen, despite of the same shape. This impression has remained in my heart until I had another chance to exhibit my work again in Milan. At this time, I saw the same type of BMW car like last year, parking at the fair ground. Although this car was matte black, not reflective to the light, and just parked there, it was very outshining than other cars. I was not hesitated to get to know the surface of the car. With just the first touch to the car, I felt like touching the color paper in stationery store, as it was matt and smooth. I think that the car with this matt black style does look smart, and once the car owner came out from the car, I introduced myself to him that I am a product designer, and would like to ask what type of color he painted. He replied that it is not color spray, but what I saw is already covered in the body, or so called, PVC film. How could it be film? I wonder how it could stick with the body so well and smoothly as the film is very thin and completely attached with the body in every angles and surfaces either sharp or curved, without any creases or edge joints. This is absolutely perfect more than a car with sprayed color. It is one example of the influence in finishing which could absolutely change feelings, views, and senses of touch of people who experience it.

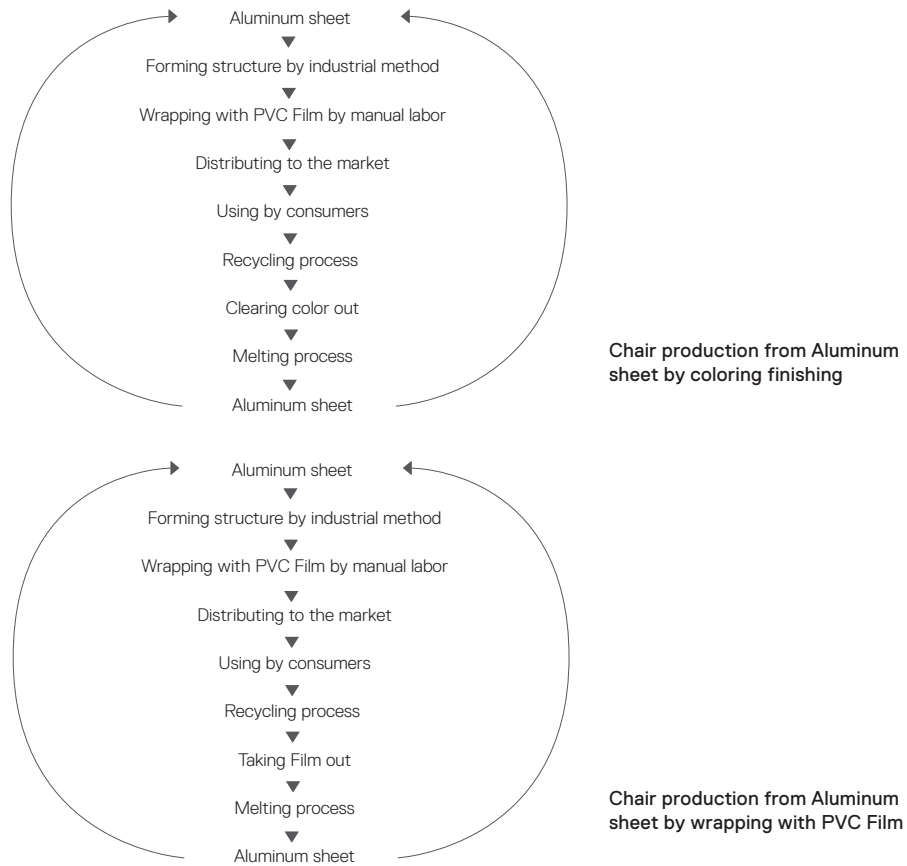
In 2007, PVC film was very new and outstanding in automobile industry. Its main characteristics are high flexibility, able to fit with any surfaces or even curves, resistant to different types of weather, and most importantly, not destroying the surface and the original car color after taking the film out. This type of material offers a new choice for people who would like to redo the car color, but does not want to destroy the original color from the factory, also protect the original surface of the car. In the early stage, this material had been done by wrapping, which is quite costly. However, in 2011, all types of wrapped car on the road have shown that the cost is now affordable for any classes of people, not only in Europe but also in my hometown.



How to wrap a car : <http://www.youtube.com/watch?v=kLsmPbPyE00>

The installation needs hand-made skills from human labor. I notice that this is one of the causes that none of furniture in the market is produced by this type of finishing; even though its benefits are high and unique, not only allowing to have customized furniture, but also reducing the production process in the industrial system. After considering it and noticing that this type of material will help me go beyond the limits of the normal finishing, I strongly want to prove that one chair does not need to have one color, and reflect the good point that this type of production could be done regardless of production amounts to worth the cost. Moreover, the chair with the same design does not need to have the same finishing, and this is a challenge of furniture wrapping with new material for this project.

Furthermore, this project could be preserving the handicraft process under industrial concept. In my view, I believe finishing in this process could save the environment since it does not need chemical process for the surface, and decrease the steps to harm the environment after the product is expired too.



From the graph, it can be seen that the chair production process by Aluminum sheet by wrapping with PVC film is less complicated, while it needs higher handicraft expertise in the production because human labor is involved in the important step. At the recycling process for the finishing by PVC Film, it is very simple by cutting out the color clearing step. This industrial step needs time and high cost.

From the graph, it refers to the industrial process and handicraft from human labor in the same production; I come from Thailand, the center of production which is different from Western countries. I grow up from the place where it values on human-made production process. The successful work in international market tends to have handicraft process involved, which is called Industrial craft, the combination between industrial production process and human-made process. This could help me open new perspective to this project easier because the final work does not depend on only machine but also handiwork.

THE HISTORY OF INDUSTRIAL CRAFT

We may need to trace back to after WWII, around 1950s, which was the golden age for Thailand's economy. During that time, manufacture was cheap while quality needed to be high; as a result, Thailand was one of the largest centers of OEM (Original Equipment Manufacturer) in Asia. As the other neighboring countries were suffering from the war both inside and outside, Thailand was rich in resources, mountains, forests -as well as- ores. Thailand was the main target of Western countries to set up their manufacture base for both machinery and household ware, and ship these products back to their countries. However, after countries in Asia started to recover from the war, Thailand started to face economic problem especially in industrial sector for machinery parts owing to the fact that China and Vietnam took this industrial base instead of Thailand, since both countries had much lower human capital cost than Thailand.

The interesting point is that handicraft, which has remained its stand up until now despite of increasing GDP (Gross Domestic Product) for the country as a whole. The reason why handicraft work has still remained its stand up until now though most industrial sector from that time had to close down from economy crisis is that this handicraft type is derived from skills which could not be replaced by machine, also this type of work is in a high level of demand from European market, particularly medium-high end

The handicraft products at that time tended to be launched into the market as souvenirs of which almost 100% were produced by human hands. So, it could not serve the wider scope of the, even though the target of this type of products had high purchasing potential, and major consumers were in Western countries. Moreover, this handicrafts are made from the combination of culture and local materials, becoming to be product without any design process. Local people or small organizations did not have their own design style but only were hired to do, or copied the old patterns, so the brand identity was weak and individual products could not stay long in the market owing to the lack of accountability

The design involvement has begun since 1995. The major part of the development may be derived from design students in Thailand since they had a chance to study abroad in the world leading design schools, and after they came back to Thailand, they could help in developing design schools, and design personnel. In 1989, with economy crisis, some factories changed some parts of their system from OEM to be ODM (Original Design Manufacturer). New entrepreneurs started to pay attention to the combination between machine and handicraft, together with the increasing support from the government. Not too long after that, Thailand started to have our own design organizations including product exhibition for those products with creative process behind them. According to the Department of Commerce's survey, the successful performance in international market both in sales

volume and image is not just in products that are purely from industrial manufacture, but are partly involved with handicraft too or as presently known as Industrial Craft

Since 1998 development in product design in Thailand has continued stably and strongly with the value of interior décor item market in Thailand in 2010 higher than 1200 Million Euros (Kasikorn Bank, Thailand, 2010) the furniture gained the market share over 50 % which was very high during a period of 20 years



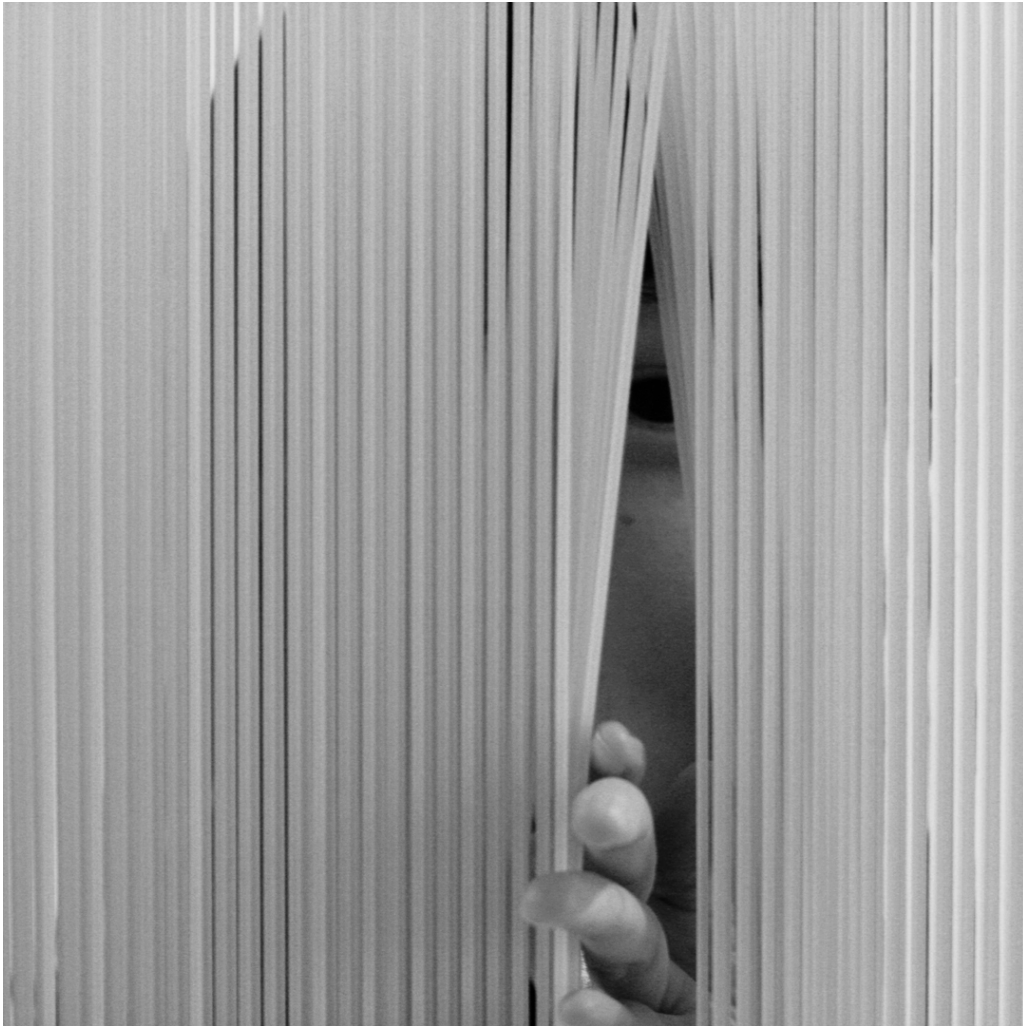
Doonya armchair: Another good point of Industrial craft process is that it help to support local people giving job opportunities and income raising activities. This is valued as Design Ethic. The local expertise is passed from generation to generation in an inimitable way.. For instance, in the project of pineapple fiber paper chair, which began in 2006, a mega project of Yothaka Co., Ltd., the leading in furniture design company in natural materials in Thailand. The main objective of this project was not only to create the new dimension for furniture industry, but also to support local people producing pineapple paper to launch its fame and ability into the market. Also, the original product of pineapple paper could not create profits. After this first furniture collection had been launched into the market, it has not only just created profit making but also gained many international awards including being selected to be exhibited in many product expos all over the world. This helps create income to local community and family. The structure of pineapple

paper chair is made of metal by the general industrial production process; while the selection of paper color and the process of putting the paper into the furniture could only be made by hands. In industrial process, all work is the over 95% the same, in term of details, because it is made from the same prototype, but the outstanding points of Industrial Craft product are that even though the furniture looks the same, but the details are different and unique in each of them. I view this as the special charm of design that insert value of handicraft method to be involved in the production process in which no other way could copy.



Poejung: This is a design example that is made by Industrial craft. I made this project in 2007 with the initial idea of making very thin, at the same time, strong partitions, which in theoretical terms is contradictory since strong things normally are huge and heavy. We decided to form the shape from metal sheet as the main structure. While we felt that metal projects too strong and not user-friendly, we inserted a feeling of nature into the product by using handicraft over the metal structure with wooden paper. The weaving part also covered the front and back, using polyethylene lines which have the

quality of transparency covering all over. This product also requires handicraft expertise in this field. The main function of Poejung is to be the partition in the room, while its polyethylene's characteristic of flexibility could be used as book and CD shelf. I take Poejung as a good sample of design work manufactured by Industrial Craft. The beginning is by machine, but the final process is by hand.



THE POWER OF FILM AND PROJECT'S PURPOSE

My design work, at all times, starts with materials. I consider carefully how I could design from the materials to transform them different and outstanding ways that no other materials could do. On the other hand, for example, if we design furniture from good quality wood that has charming and beautiful pattern, but in the end we choose to spray the color in the finishing method, I think this design work loses distinction in terms of design. It seems to totally destroy the value and truth of the materials. Therefore, no matter what the processes for structure or surface covering, if we need to use new materials to be the main materials in the process, the final work should present new product in the patterns that no other materials could do.

I strongly believe in the beauty that is derived from the strong intention for this project, which is the furniture design that has the shape forming in industrial work process, while the surface covering process with firm in the final stage is made by hand. For the initial idea of this project, I think that film is the material that is a highly versatile choice, but with the surface covering methods which needs to use manual labor, it is then not popular in the industrial process. The importance of hand-made work is that the work in the parts that could not be replaced by machines, on the contrary, I see the work that has hand-made method would extremely increase the product value.

Images on the right show that even though the four chairs have the same shape, the surface methods are different, obviously resulting in the whole picture of the products. For instance, the sample chair on the left side is made from plastic, and the color is integrated into the plastic before becoming to the product, as a result, this piece of work has only one color according to the production limit. On the other hand, other chairs on the right side is wrapped with film, which when compared with the first chair; it obviously shows that the chair with film is a lot more interesting because of its increasing color dimension made to just a few pieces of layers. When taking a look on the first chair with the same shape, it also has some beauty and charming look, but does not present the dimensional depth as the other film-covered chair.

According to the industrial aspect, chairs made with different color layers could be possible, but is costly, since it needs to build separated molds and produce in different times, then combine them at the end, resulting in little market interest due to the high cost. We know that if we design the chair, in my view, what we need not to say but most important to have are the comfort when sitting, and the production possibility. Therefore, what we should most importantly place the value on is the 'concept', in other words, the concept that does not involve with production process and comfortable use, but does lead to the final product that is fresh, sophisticated, and launching new perspective to the market. The importance of this project does not depend on which type of furniture I would design because: The objective is to present new perspective in the finishing process by surface covering with film in the pattern that no other coloring process could do.



Vegetal chair 2008 / Designer :
Bouroullec brothers / dimensions :
813 × 606 × 552 mm / Vitra

AN IMPRESSION
OF COLOR

This project deals mainly with surface covering; therefore, before getting into the design shape of the chair, I would like to place an importance on the first part of the design process, in other words, 'surface covering method selection'. Since the method selection could be integrated into the further steps in designing the chair, I strongly believe that the selected surface covering method will affect directly to the chair shape.



In theory, we understand that different colors give different feelings, on the other hand, from a product aspect, we see that the variety of colors appeared in the market, through industrial manufacturing process, is rather limited, such as simply red, black, white, and yellow. These are the accepted colors in the market, in other words, it seems that consumers do not have much choices.

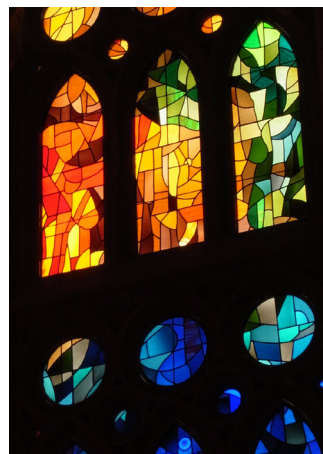
But from the illustration, the film color has a high level of variety so as the color used for publishing and printing. For the product to be attractive to consumers, this prominent point of the film, accordingly, could add great value to the final product in this project in the way that no other materials could do. For this reason, there are many solutions.

SOLUTION 01

I am interested in architectural work. Many of my designs have the inspiration from the details of architecture both modern and ancient. This is one of the samples of the details in architecture that has inspired me. The feeling in that moment was the eagerness to try to adapt the knowledge to furniture design. However, at that time, I was not aware of the film material that is durable and has many colors which could transfer into this concept, so I kept this idea in the book. From the picture, you can see that the interesting point of the wall is not just the light changing that comes through and creates colors, but also the variety of colors in the glass that connect to each other as pieces by highly-skilled experts. Consequently, every piece has its character, size, and ratio that are different but when combining together, beauty and unity perfectly shine out. Some parts of the wall may be caused by the combination of only orange color but when considering it carefully, you can see that the orange color in each piece has such color intensity that is not the same as the inside (Enlarged photo).

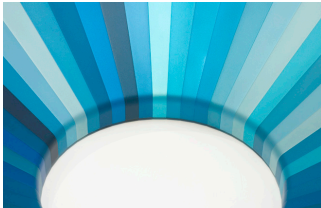


I tried to convey the idea from such inspiration into chair drawing by using the film quality instead of glass. From my view, if we use this method in the final surface covering, it will highly be outstanding and becomes a very extraordinary art. With such reason, I think



that this final piece of work will be costly too because each step needs special handicraft skills. For production, quality control and quantity in terms of mass production, it tends to be difficult because each item needs quite a long time as well as this type of surface covering needs precision and expertise only.

SOLUTION 02



Iris Table (Limited Edition). (2008).
Designer : Edward Barber and Jay
Osgerby . England: Established &
Sons

From the first concept, I have developed the idea further to be more simple and understandable but less complicated in the industrial process. I have reduced the cutting edge of the film from the free-form shape to be more geometric form so that it could convey the feeling of modern identity, and could easily control the color in the production aspect. From my point of view, this solution is very interesting in term of production and method, but the disadvantages are that it lacks of originality, because from my experience I have seen many works and interior wallpapers in the market that have line-up colors. At the same time, this process is not yet appealing, because there are other types of surface covering that could be replaced, such as painting, etc.

SOLUTION 03

Using plain color covering the whole furniture or simply using film instead of painting could be another solution since normally users have limited choices of furniture color in the market. However, if using this method, users could choose the color to create Customized Furniture by themselves, which means coloring on furniture like choosing the painting color for the house. In an industrial aspect, coloring for each time must focus on quantity. For example, it is possible that we need to wait for 100 pieces of chair structure to be finished then send them into powder coating method to do one color, because spraying each time has quite a high cost. Accordingly, this solution is interesting; nevertheless, it is lack of uniqueness that could communicate about furniture wrapping with new materials in the way that no other materials could do.

SOLUTION 04

What excited me after the research process is the solution concept. I found that although film has many colors, it has similar characteristic as paper, which is “printable”. The printing color is a special type that has durable quality to weather conditions and detachment. With such reason, this is the most interesting solution. This solution completely fulfills the desire to present the design through new material in the way that no other materials could do. In other words, if we do surface covering with this type of finishing, the chair that is covered by film could not only have any design patterns, but rather

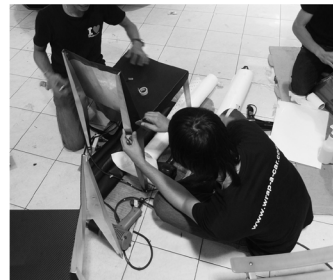
be useable in outdoor area same as driving cars on the street!!

After a careful consideration on the previous solutions, if we need color differences for each piece of object, at the same time, has a printing quality in film production, why don't we combine both together to open the new vision for the product. With this concept, the last 'film' solution could be developed no other materials could do, because it is simple, comprehensive and quick, and most importantly, highly unique, especially with 3-dimensional work that no other people have ever done, such as gradients. Normally, this type of work tends to be included in illustrate or 2-dimensional work, as mixing different colors into the same area from light to dark, dark to light, warm to cold tone, or in the same tone. The outstanding point of this method is to add another dimension to the item, add depth to the product as same as create shading as shown when drawing. I believe that this is the answer for the finishing process of this project as the goal is to design the chair that has both shade and shadow within itself, by the quality of the film that could be printed. Finally, the chair will be highly outstanding and unique, and most importantly, it will become a tangible art for anyone since the combination between manufacturing by machine and by handicraft are not too complicated. According to the above reasons, I believe that surface covering in the fourth solution could be an excellent way to understand the design process for the chair formation which directly responds to the target group's need.

“NUDE” CASE STUDY AND EXPERIMENTAL SECTION

In the late 2010, I had an opportunity to work on a chair project produced from aluminum sheets. The concept of this work is to answer how the chair could present the property of the materials and could optimize the use of machine. Finally, the outcome is “Nude”, a chair with a simple but strong and unique shape. In the manufacturing process, “Nude” used Revet, attaching each different part together instead of welding, resulting in producing different parts out of each other as the seating part and the structure part.

Due to this, it consumed less energy and time for production. Generally, there are a few choices for the industrial surface finishing processes for producing aluminum chair; for instance, spraying by electric or powder color spraying. After forming up the structure, I wanted to invent the new method to cover the aluminum surface; however at that time I did not come up with the use of film, so I did not cover the surface, until mid-2011, there was a furniture contest in Singapore under the theme, Sustainable Design. From my view, Sustainable denotes different perspectives not only the popular one as creation by the waste materials alone. As a result, I decided to participate in this contest with “Nude”, by focusing on the thrifty use of materials and energy saving in manufacturing process. I took this opportunity to test on the surface covering by film in the finishing process because it could create new dimensions and it has allowed me to be familiar with this type of materials. This could count as the experiment to understand the method that I can use in my thesis. After the test, I have discovered many good points of this method in many angles including manufacturing, inspiring appearance and environmental-friendliness. Firstly, the film surface covering has no chemical use or energy wastes as other forms as coloring. Secondly, manual surface covering allows consumers to control the details and areas that they desire while coloring offers no possibility for a variety of colors in one chair so the manufacturing process has to be separated and later integrated again, which results in high time and energy consumption. Moreover, consumers could choose to customize their furniture in their own style with this film surface covering, because film has similar shades as pantone papers, which have different color codes, while in industrial process where the special coloring for small amounts of items could be costly. This is one reason why there are a few choices for chair in the market. The special character of surface covering is to use handicraft. This helps to conserve manual skills as well as work in industrial sector.









By using “Nude” as a prototype for film surface covering, there are many advantages as well as some improvements needed for further projects, such as the surface covering for items with complicated shapes could have too many angles that cause difficulty, delay and could be not completely neat. The experiences and facts that I have discovered are very crucial for the furniture design process in the future steps.

VEHICLE FILM
EXPERTS
(IN COLLABORA-
TION WITH **3M**)

After the contest, I could conclude some difficulties about the film choice. This is technical knowledge which is very important and fortunately at the early stage of product development, my friend had introduced me to Mr. Risto Anttonen, a technical engineer who is expert in surface covering materials of 3M company in Finland, a leading company with many branches all over the world providing many products from automobile, electronics, medical, as well as film business.

During the first meeting, Mr. Anttonen gave me interesting points of views and knowledge about the choice of film; for instance, film that the big company as 3M is producing could be categorized into many forms depending on the use. In terms of the thickness, there are ranged from 50-300 microns, and generally for text type of work or e-cut work, the thickness of film should be about 50 microns. The same type of film could be categorized into many different types to match the use, such as for primer liquid to smoothen the surface. Also, for the work that needs higher level of durability and finest appearance, it may need a sticker type as Di-noc or Scotch print 1080 which has the range between 90-230 microns. The most important point for this type of film is that the beneath side has air ducts technology (while some models have tiny glass pebbles beneath the film which work together with the air ducts to allow the first placement to be fixable), which has a quality to smoothen the film surface neatly with the work as it eliminates the air bubbles easier than other types of films. Mr. Anttonen suggested that this is the interesting point with furniture not only due to beautiful appearance it could create; this film could also create higher durability than other types. Another interesting type of film is for printing work, but it is costly, only suitable for the work that truly requires special differentiation. Besides the film quality, the texture of the film is also important. The right texture should have glossiness and smoothness, which in this case Mr. Anttonen views that aluminum mirror or forming materials is suitable to be used for film surface covering.





SCOTCHPRINT 1080

90 μm

• CAR WRAPPING

$\sim \frac{1}{11} \text{ mm}$

• COMPLY & CONTROLTAC

1,52m x 22,86m

PRINT MATERIAL

SCOTCHCAL

1J20, 1J25, 1J40C

• FLAT SURFACES 3-5(6)

63-100 μm

1J170Cv3

1J180Cv3

50 μm

→ 50 μ m , $\frac{1}{20}$ mm

SC 100 (80, 50, 30) series

- e-cut : text, logos
- windows, car sides 1,22 m
x 50 m
- water app. OK

DI-NOC ~ 230 μ m ~ $\frac{1}{4}$ mm

- walls, door, (furniture) 1,22 m
x 50 m
x 12 m
- Comply (= air ducts), Controltac
(= glass pebbles)
- water app. - BAD





With a lot of technical knowledge and experiences sharing by Mr. Anttonen. Finally, 3M has involved with my project in technical support, and sponsoring materials in the project, as well as sending experts in surface covering to join the prototype production as well.

PRODUCT POSITIONING

Before getting into my design process, I would like to begin with the data analysis regarding what the final work is placed in the market mechanism. Generally, most leading furniture companies tend to classify their products into two main groups; firstly the products that are designed for preserving brand image, strengthening the brand, and convincing the users on its design capability. This product group mainly acts as the brand presenter of the organization to stimulate the market, which at the end these products do not make much profit, and could be more attractive to collectors rather than commercial sales. In contrast, the other group of products is made for sale, but may not be promoted with the brand much. It rather maintains the cash flow for the organization, and tends to drive to the target group with design strategy and marketing at the same time. The target group of this type tends to be a large scale as hotel, resort, and interior design. In my point of view, the products placed between these two groups are interesting, in other words, the products that are both brand image and profit making. From my experience, such products are likely to be in leading design companies in Scandinavian countries. Each product has been developed for a long time before launching into the market. Consequently, the beauty from the function of the products is not just only a short-term fashion, but indistinguishably harmonized with the consumers' daily life. With the above reasons, I am not surprised why one piece of furniture may have a long marketing life up to 20 years.

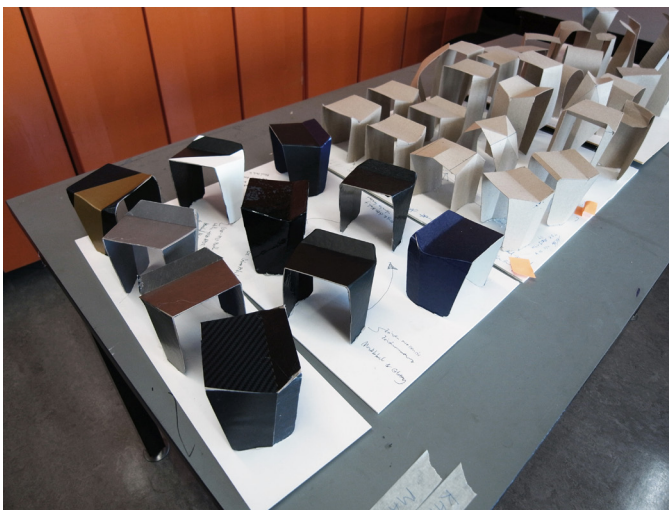
Therefore, I would like to place the final product that is launched into the market between the extremes. Also, the product needs to be suitable for everyday life, at the same time, not too plain or common that no character could enhance the value of unique piece. For this project, I choose to explain the surface covering for the new material through chair design. I think that the chair design is the most challenging work in furniture design as it is the beginning point to expand into other types of furniture, and most importantly, I believe that the chair for this project could greatly present the capability of the new material in its surface covering.

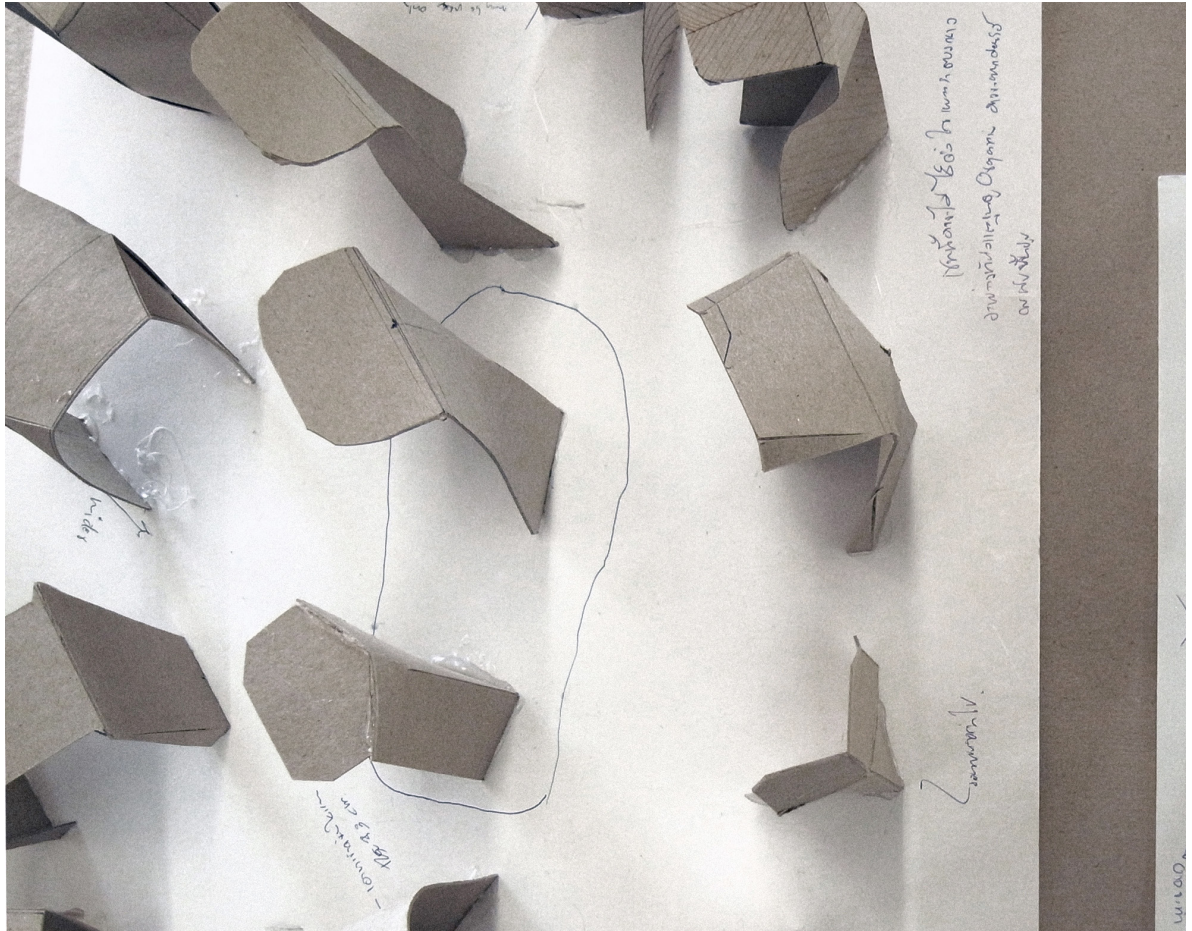
Nowadays, it is inevitable that there are many types of furniture, especially chairs. I had started this project by designing the chair, called Universal Chair, with the focus on its multipurpose of sitting for working, eating, etc.; however when considering the quality of the film in the first stance, I found the simple and less structured furniture should be more interesting in presenting the surface covering by this type of material. The final work was expected to be the half art, most importantly, with the practical utilization. With such concept, I thought of stool chair type.



DESIGN SECTION

As previously mentioned, this project does not fall directly into furniture design; however, its core aim is to show possibilities opened by sing film in furniture surface covering. From my own designer's view, this Stool design is not just for outstandingly presenting the film surface covering, but must be found comfortable by users when seating as well. The design concept for this Stool is derived from the surface covering experiment with Nude chair. This experiment has enabled me to know that the suitable structure of furniture design for film surface covering should have a wide and smooth surface with no complicated details. Since the complication could obstruct film attachment, resulting in delays in manufacturing, and the work could easily tear.







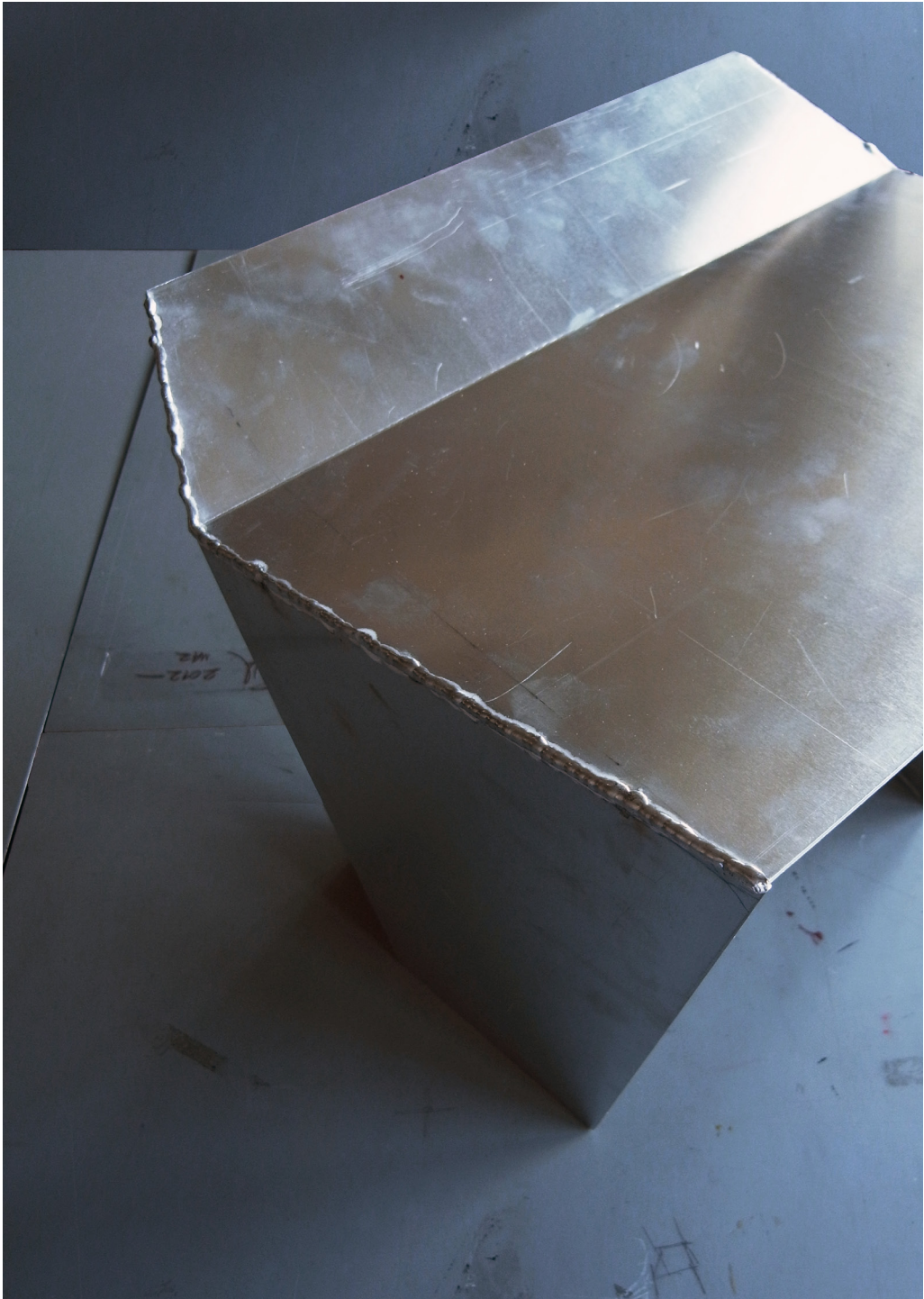
In the design step, I chose to use sketching method by folding paper, or so called Model sketch. I believe that this method will enable designers to have their satisfied shapes quicker and more precise more than pen drawing on paper. Moreover, I chose metal sheet as a raw material for this project; therefore, using paper in creating basic forms could result in the work that are closest to the final work. From the picture, it shows that I began with model sketch without scale, folding as I wish to allow material to be absolutely utilized. After I had an interesting shape, I started to scale with 1:5. Once I satisfied with the shape, I used 1:1 scaling by testing different ratios to find the best distance for the final form.

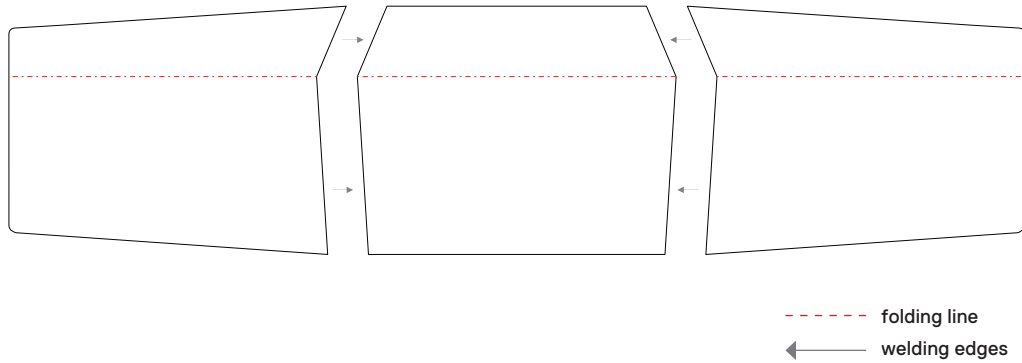




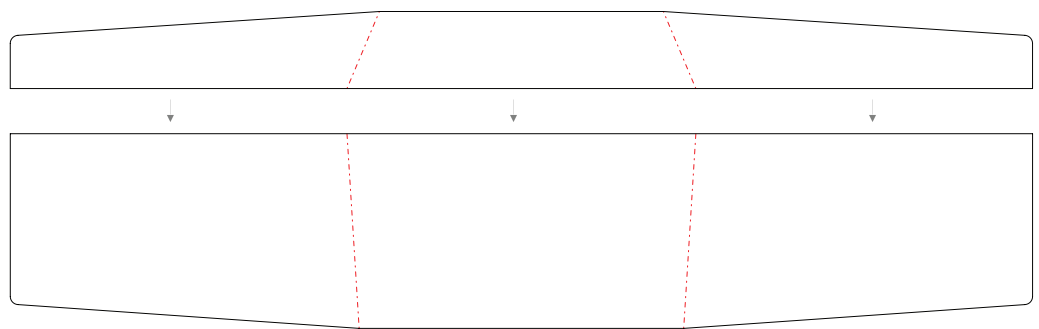


The final result is expected to be simple while outstanding in details; not too many to be irritating, but enough to be remembered. After forming paper prototype as previously stated, the Stool must present not only the beauty of shape and surface covering, but also provide users with comfort.





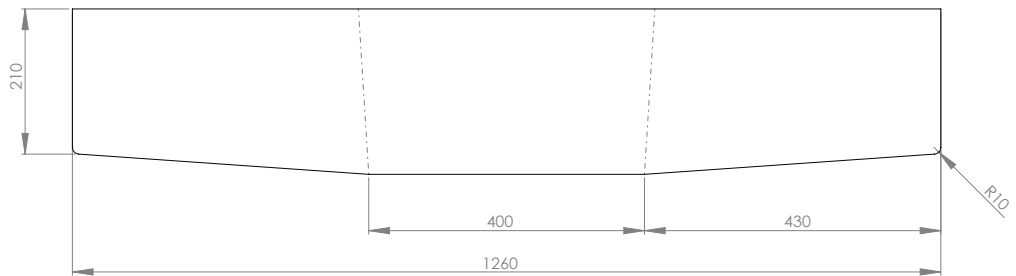
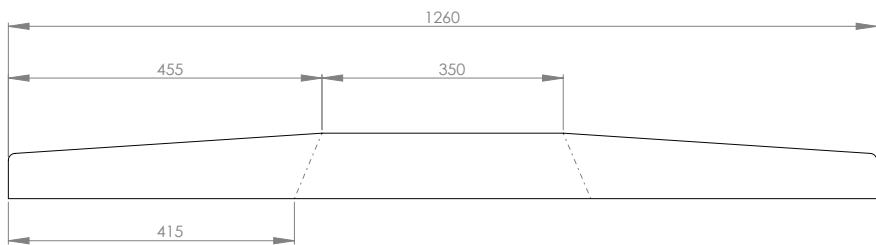
Accordingly, to prove whether it achieves these aims is to form the real prototype and test seating. After having the real form with real raw material, I found that the production details are very important, especially folding line and welding joints. From the picture, it shows the first prototype that divides chair into three pieces by separating into left, right sheets and seating sheet. After that, I folded up to form and connect them together by welding as shown in the picture. The first final outcome has some problems such as the thickness of aluminum. The aluminum is 2 mm thick, so it is not strong enough and causes shaking when seated. Also, the welding edges on the side impair the chair strength, and create sharp corners between side panels and seating, which could hurt the users.

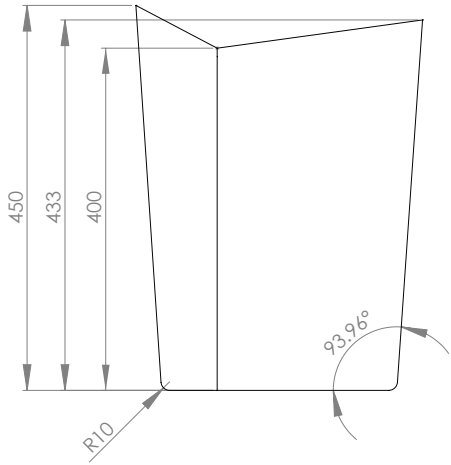
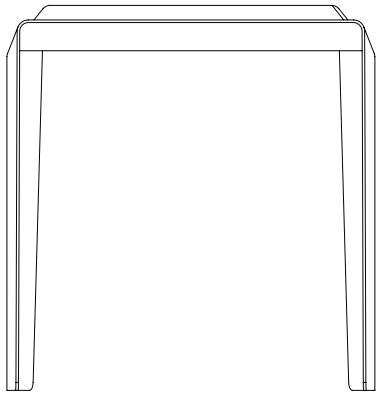
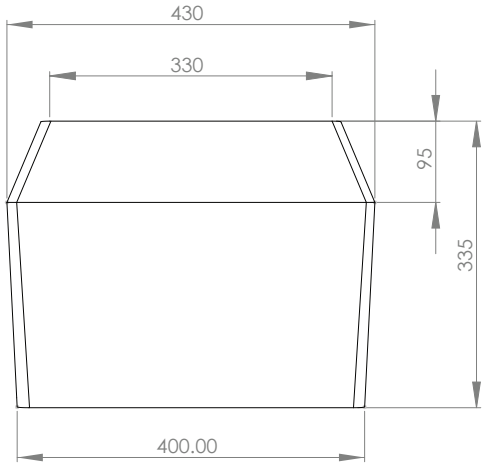


--- folding line
← welding edges



After learning the problems from the first prototype, I had developed more details including seating angle, and production process by deciding to use 3 millimeter-thick aluminum. However, with the limitation of school workshop machine, it could not fold metal with thickness over 2.5 mm. As a result, I decided to use 2.5 mm steel sheet which has a good strength, but weighs much more than 3 mm aluminum for prototype.

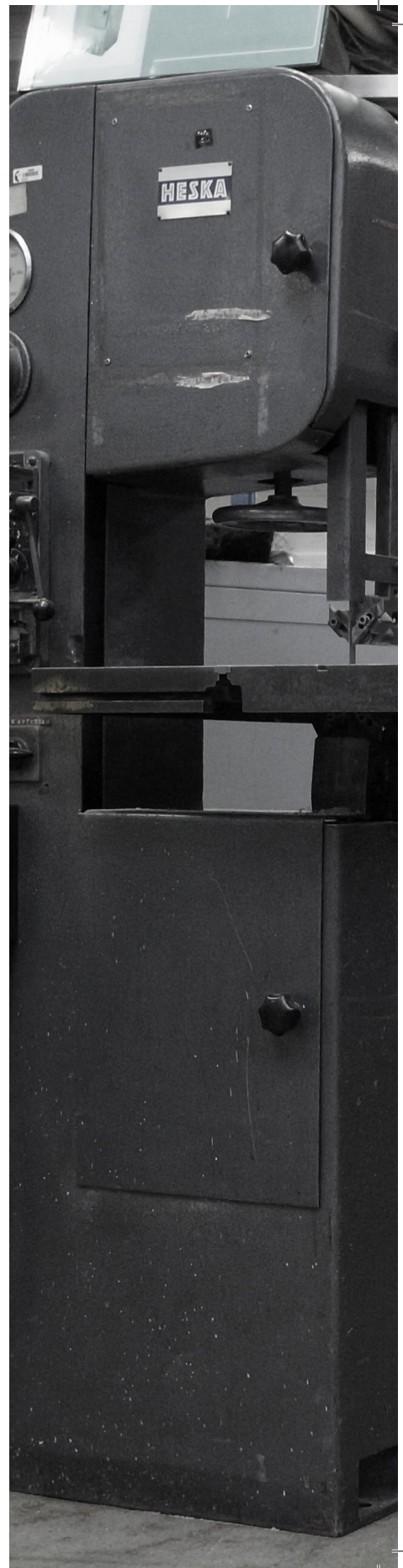








The outcome from this final development is a comfortable seat, especially seating folding details do not only help strengthen work but also suit well for users' body shapes. In term of production, I changed from my initial plan of 3 pieces part separation into 2 pieces, and changed the welding line from the side to be the center, resulting in higher stability of the chair, and this folding type helps reducing the sharp corners hurting users' legs too. In terms of logistics, we can help making each chair stackable for easy transportation By opening the angles between side panels and seating part. However, I would like to focus on the surface covering material, so I think that the angle adjustment step to make the chairs stackable is not the main final purpose. Therefore, I decided not to disturb the chair shape and let the angle stand up 90 degree.





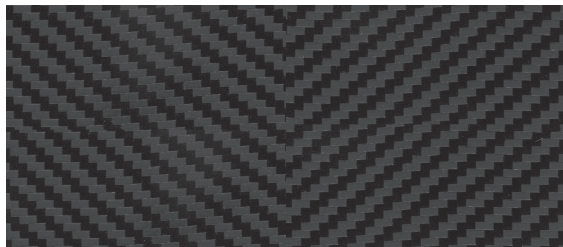
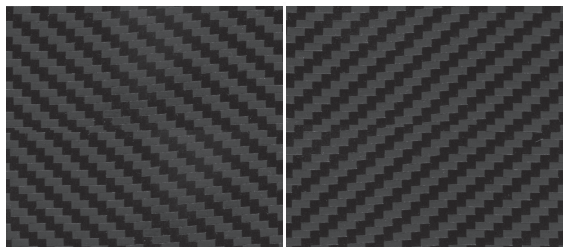
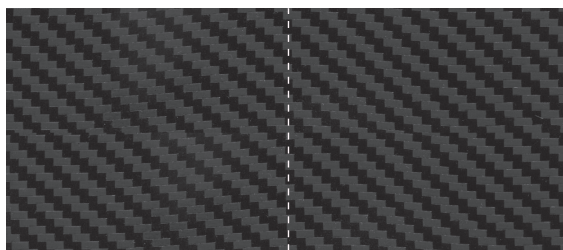
COLORS
TEXTURES
AND
PATTERNS

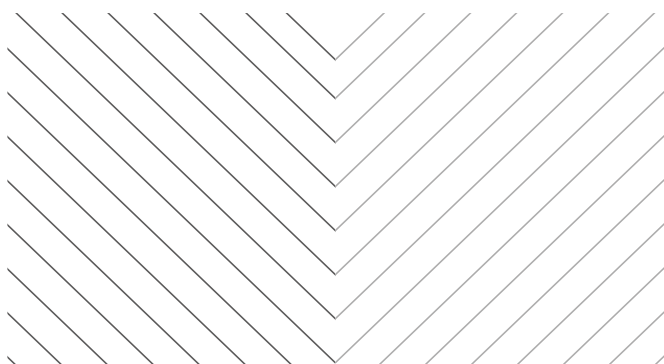
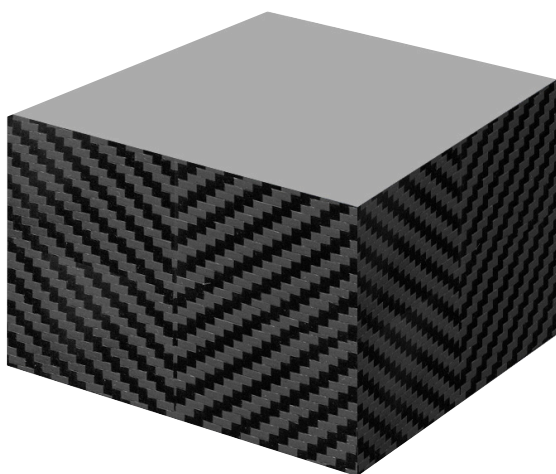
Before wrapping the stool with the film, I had explained about the film type selection that is best suitable for this project. Generally in the market, film has various colors and patterns, as well as textures. In this project, I categorized films into two groups, the texture film e.g. stainless or carbon-fiber, and color film. For the first step, I started designing the alignment of textured film. This step is very important to show the characteristics of film creating effect that other finishing process could not do, and to help choosing between different film usages.

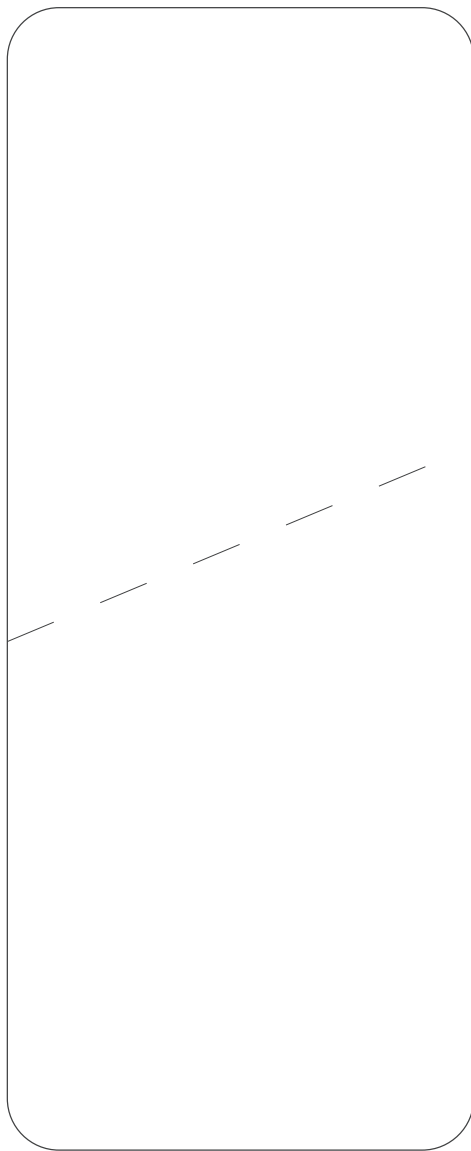
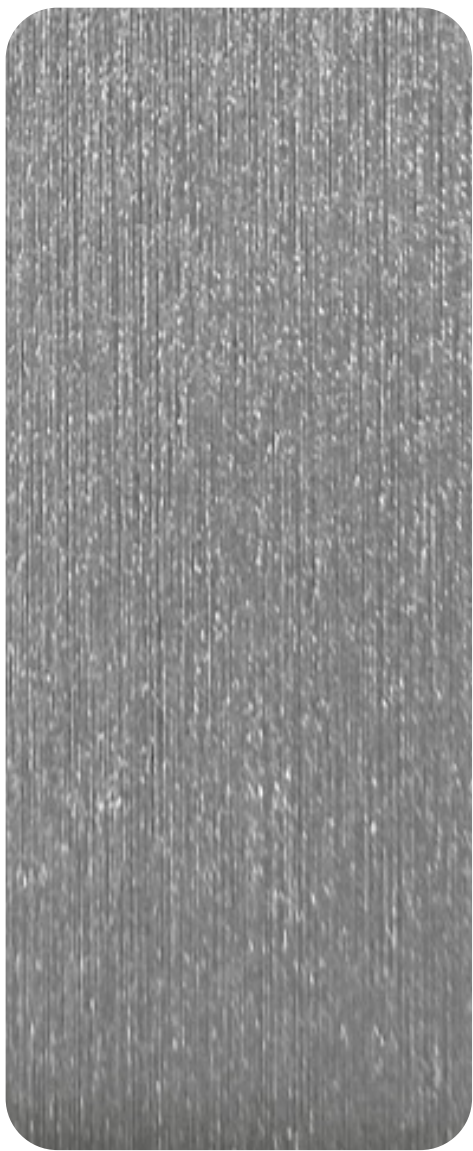


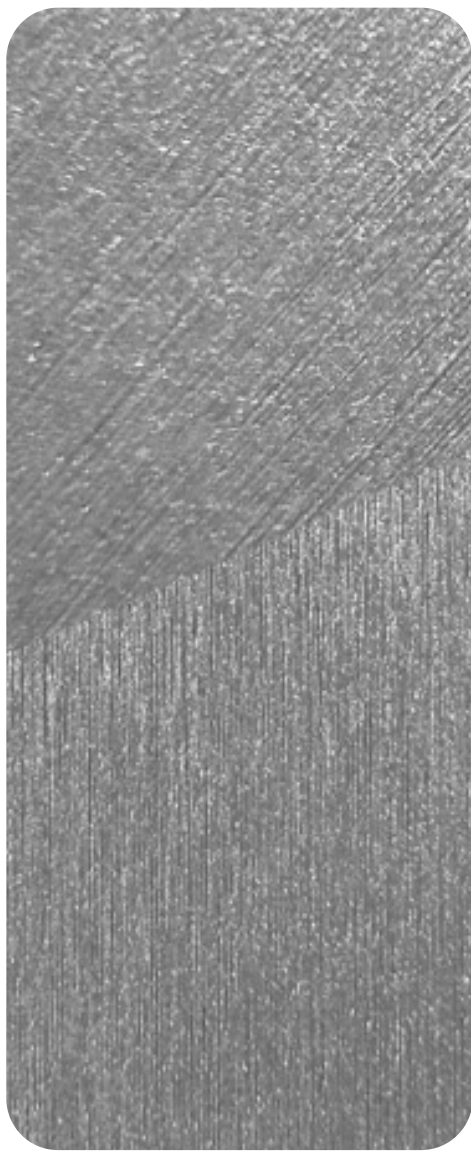
CARBON FIBER FILM

It is evident that this type of surface covering can be made by hand cut or drilled before attaching the film on the surface is not at all an obstacle for production. I started with using carbon-fiber film that has very interesting patterns. With a careful consideration on its film pattern details, the patterns of small tables are outstanding out of the film. If cutting this film into half each and turn the other side up in the mirror reversing way, it will create different patterns out of the same old styles, and if attaching the film onto the surface that has such dimensions as cubic box as shown in the picture, it will obviously increase many interesting dimensions as well. Moreover, I extended this basic concept to the new patterns. If we use this carbon-fiber film with the color film, it will create many new interesting patterns.







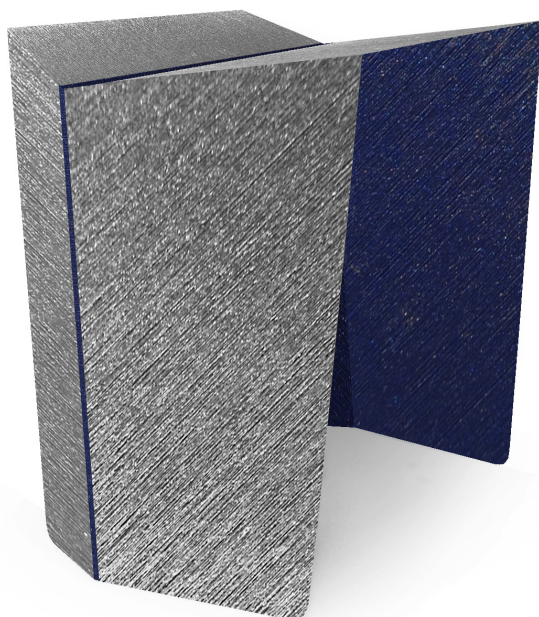
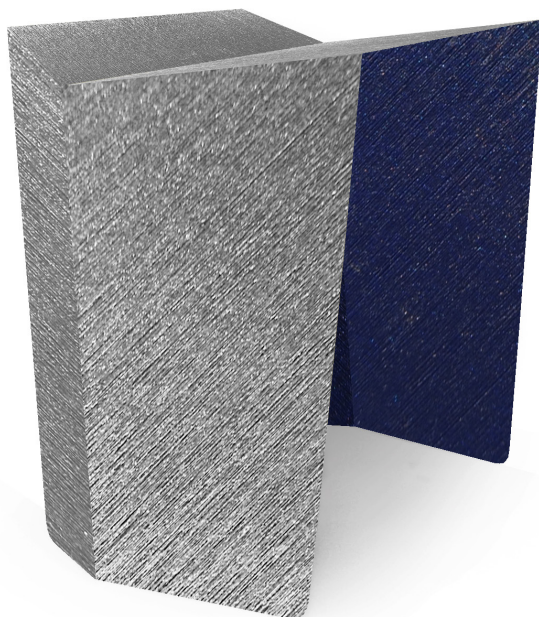


STEEL HAIRLINE FILM

Since the steel hairline film has very clear hairlines compared with the carbon-fiber, I would like to play this unique point with pattern twist. It could be very interesting because it is impossible to make by machine, and it also suits well with the aluminum folding, which has appealing feature with the light angle reflection too.

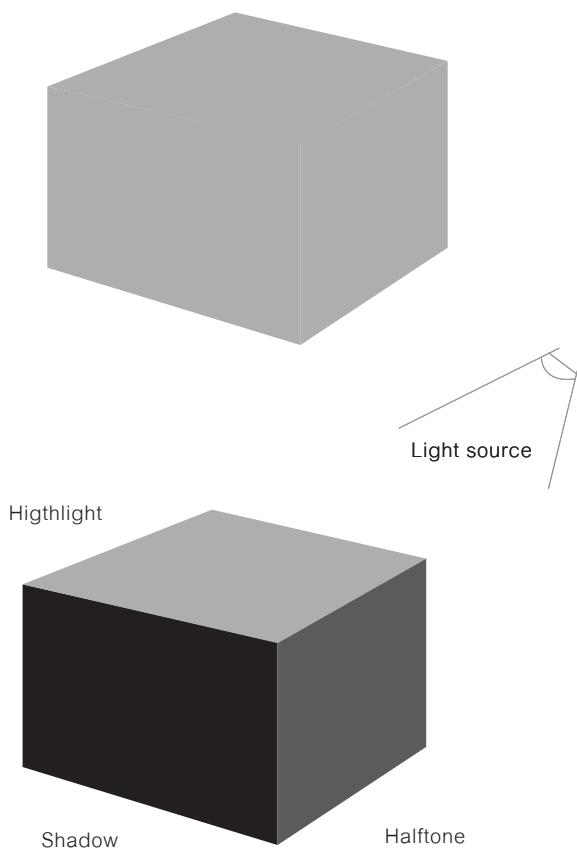


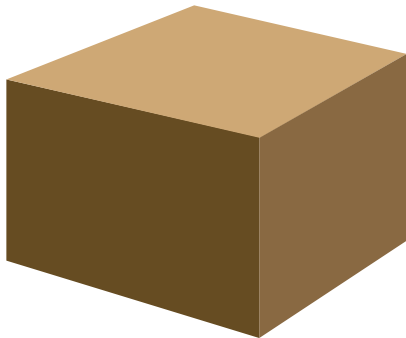
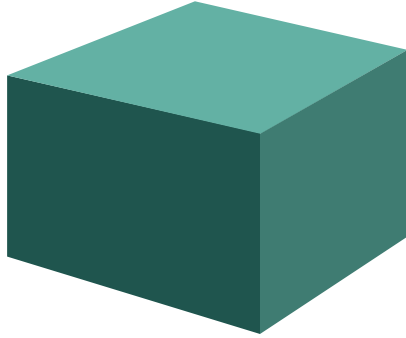
I tried using this film for pattern alignment attached onto the Stool surface by using the previously shown technique, and with this stainless film that has various color choices, the combination by using the colors and textures together with the angles of the shapes creates new dimensions views as shown in the picture.



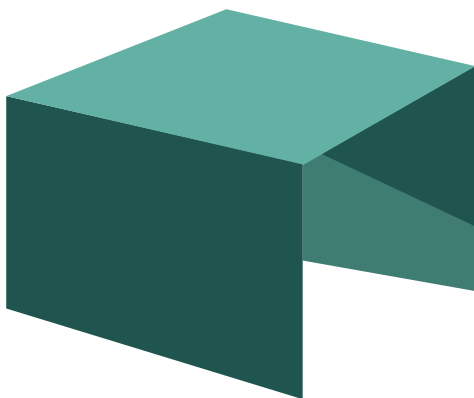
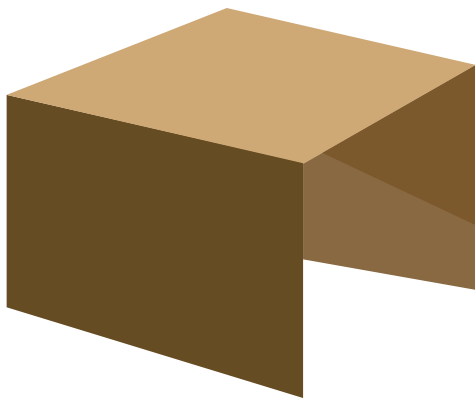
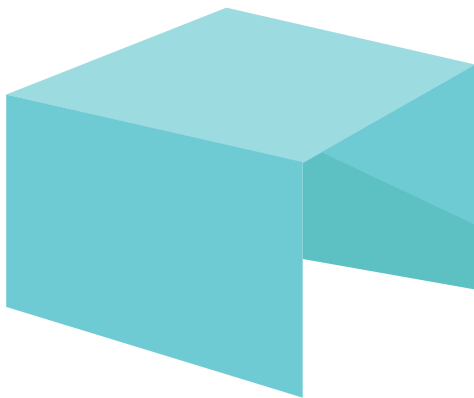
IN COLOR

As I have shown the characteristics of color film, it was my first impression for this project. In the earlier chapters, I mentioned one interesting and outstanding point of the film color that one film color has different shades; for instance, the orange color could be seen differently depending on the depth of each color level. I am very much interested in this concept, so I analyzed how to present it using the same shade of color onto one piece of work, not only to cover for beauty, but also to reflect some consistent ideas.

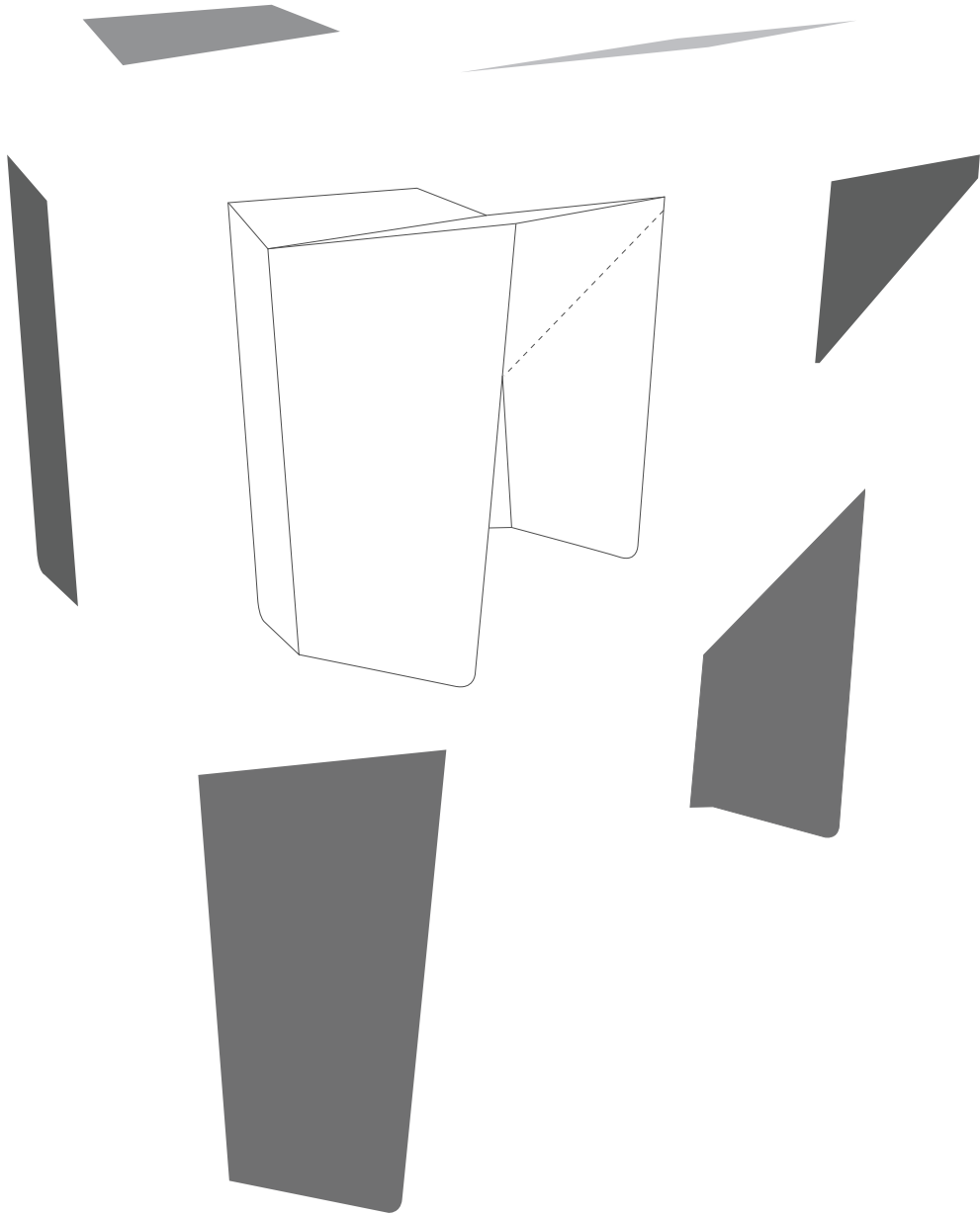
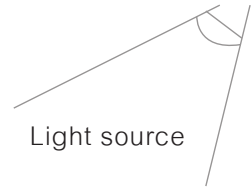


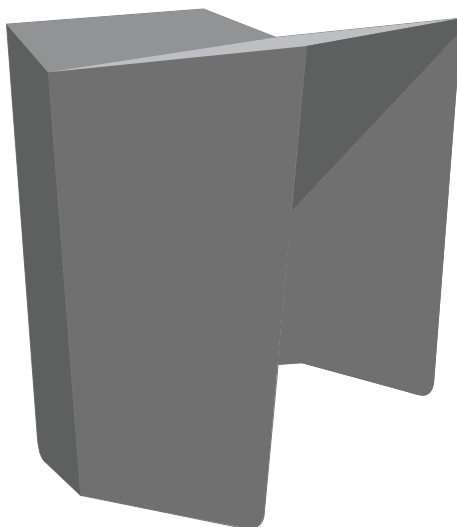


While designing the concept, I paid much attention on light and shadow since it could create great work with dimensions. In fact, light and shadow are considered to be very important in our daily life because they allow people to see the depth and thickness of all things around us. From the picture, it shows that if the light does not direct to the cubic box, it will affect the sight ability to see 2D graphic, while if using light directly to the cubic box, we will be able to see the depth that has angles. And most importantly, even though the shape of the object is coated with one color, the light will increase the depth of each point unequally. As a result, the box has dimensions.



On the other hand, light and shadow on the object is based on the shape as well. At the same time, if we turn on the light shining to the object, it will create shadow that variously complicates the color shadings depending on the depth of light. Therefore, if using this principle folding the shape to be complicated with many angles, the light depth and shadow reflecting on the object will also change.





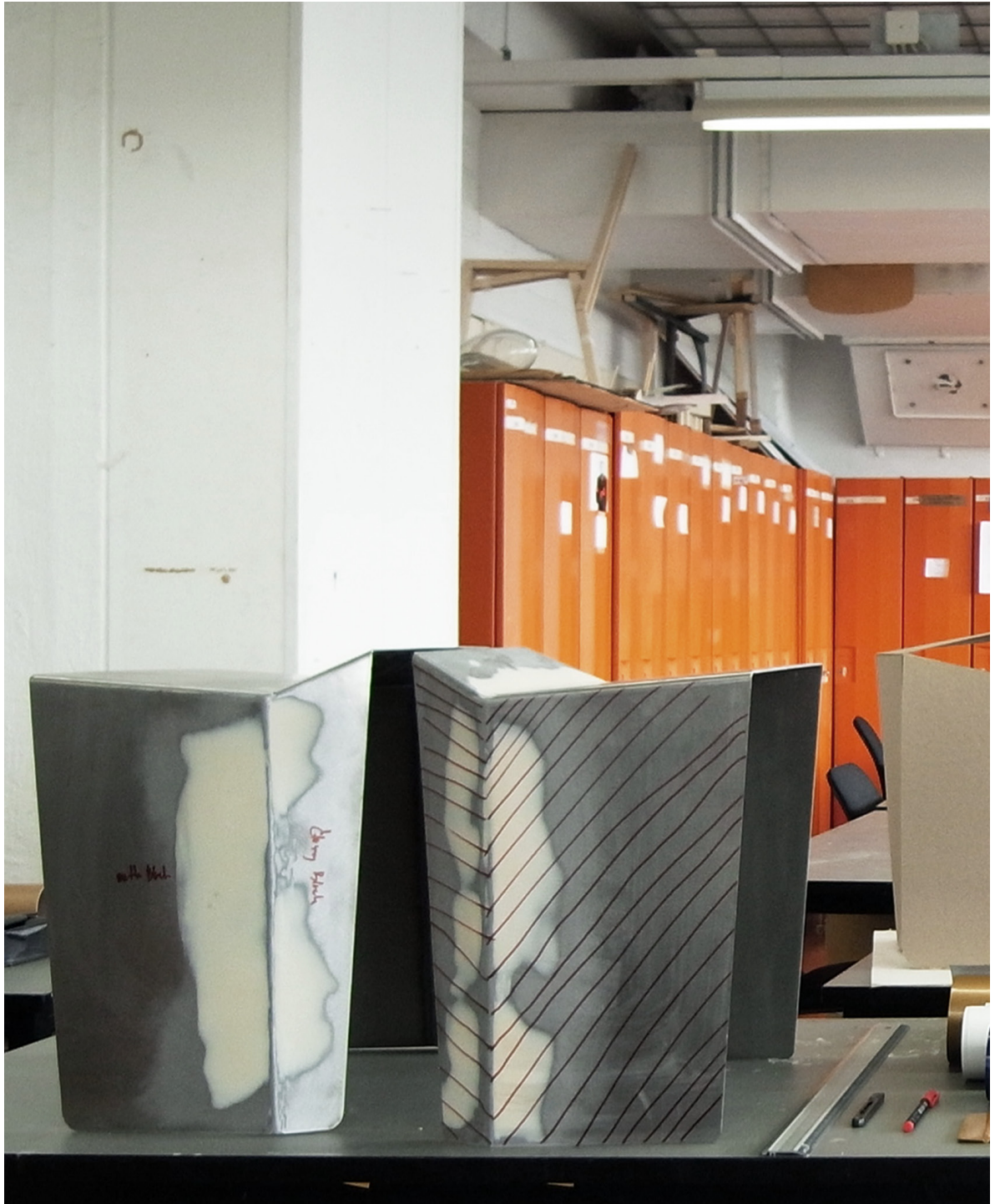
What I desire to retain from this concept is to keep the feeling and the picture from the different light depths, it is like duplicating the nature through the use of film by wrapping different color shades onto the product. From the picture, it shows that I used the grey color film in five levels explaining the quality of different light shades and shadows on the designed Stool. In my view, I believe that this concept is very interesting, but considering product positioning, it could be too much artistic and consuming much production time. Accordingly, I decided to present the obvious characteristics of film through 3 Stools that have different ways of wrapping, by matching different types of films as shown in the next chapters.

HOW TO WRAP A CHAIR

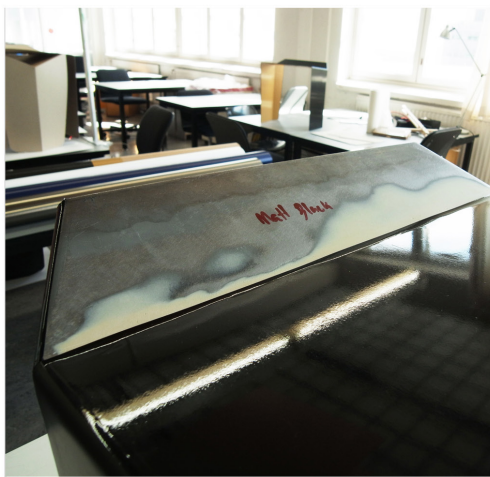
The basic importance for surface-covering by film requires materials with smooth and clean surface without any dust. This type of film has its thinness of 80 microns, therefore, any dust or tiny pieces of anything could make the surface rough and very noticeable.

In the beginning step for film covering, take the film out from the front to the middle. If the object is large, there is no need to take all out. After that, put the film down onto the object, then smoothen the film onto it with the curve edge covered with cloth and moving along the surface from the center out to the side. This must be done along with the heat gun by adjusting the temperature to be at 50-60 °C.







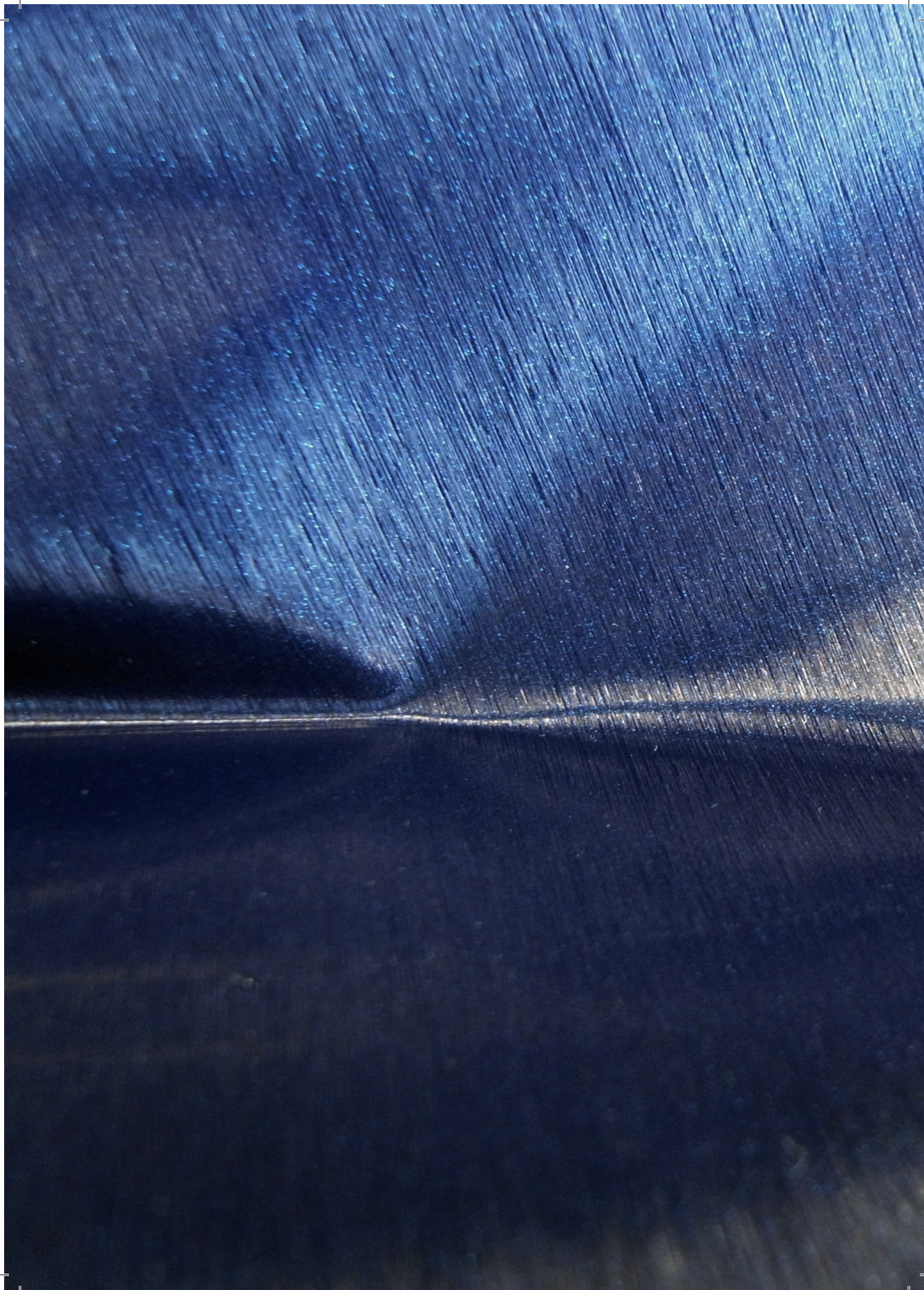




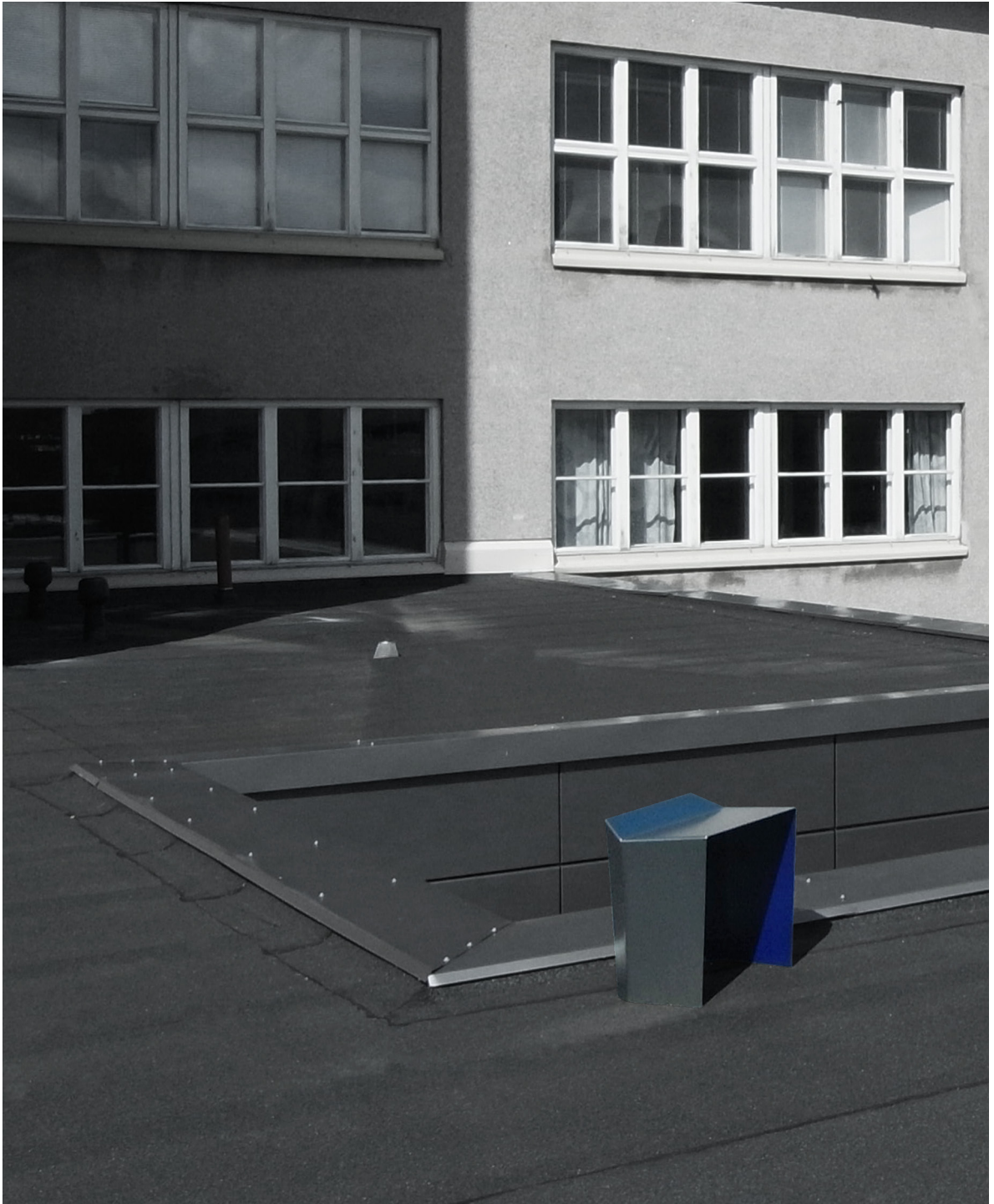


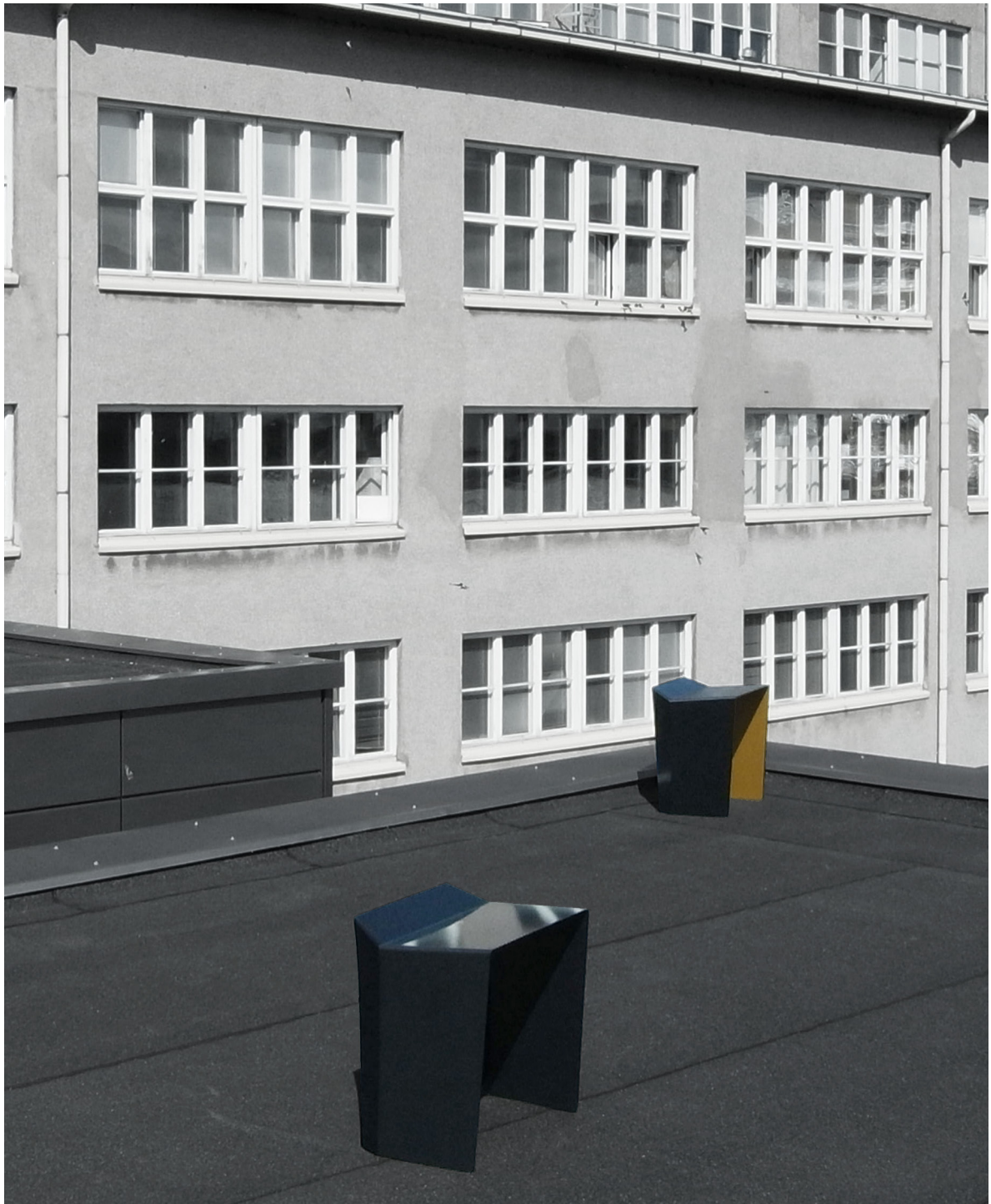


If the film is crumpled along the edge, the heat gun should be used to blow that area. This will make the film to be more flexible and able to attach with the surface smoothly. After that, use vinyl cutter to cut the unneeded parts out.















CONCLUSION

I am passionate about the design work, especially furniture. I feel that furniture is an interesting cultural products that could identify the feeling and root of thoughts very well. Personally, I believe that the quality of the design, particularly the furniture piece, could be measured by the creativity in terms of its details. From my point of view, furniture creation process has three main steps, which are designing, forming up the structure, and surface covering. From my past experiences, the businesses compete with each other on the first two processes. They forget to focus on the last process which could also crucially affect to customers' decision also. Therefore, I have devoted my time for this project to prove that this concept is true. From the example in my last work, it shows that no surface covering materials could make the same feeling as my presented method in this project. When designing, I believe in beauty that is derived from function of use and production. The beauty needs particular reasons not only from the sense of beauty but must also be the integration between technology and handicraft to innovate new ideas in the furniture industry.

Personally, I am very proud of this project not only because I could present new concepts in the surface covering, but also conserving the environment. Generally, when we work with metal furniture, coloring the surface needs a lot of energy, so as when degrading it. Moreover, coloring process could cause toxic pollution if the factory is not under standard control. However, with the film surface covering, it does not only add value to the product image, but also reduce the enormous amount of energy use in industrial process. The next step of this project in commercial sense is being developed to be suitable for mass production in order to serve the middle-class to high market and international market in the future.

In terms of education, I would like to devote the theory in this thesis as the manual for anyone who is interested in furniture surface covering by film to use it as the fundamental design concept. Most importantly, I would like this project to be an example of the design piece that falls between the technology and handicraft, resulting in the spectacular tangible art that could inspire any other designers to create the masterpieces with the materials as the fundamental focus in their creative works.



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ABOUT

DOONYAPOL SRICHAN

Doonyapol Srichan was born in Bangkok in 1984, he studied Industrial design at King Mongkut's Institute of Technology Ladkrabang (2003-5). Before graduating, he had a good opportunity to collaborate "Pineapple Paper Furniture" project with Suwan Kongkhunthian, design director Yothaka company. After that, he started his work at Kenkoon company as in house designer and spent there around 3 years. Doonyapol is interested in various field of design especially furniture design and single objects. A passion of material and Asian culture as well as simplicity, characterizes all his work.

Doonyapol Srichan have done many design with well known producers in Thailand. Owing to receiving several design awards both local and international, he has been selected to study abroad in design field by funding from The Royal Thai Government. Doonyapol has studied in University of Art and Design Helsinki (Aalto University). He has worked during summer 2011 with Norway with Andersson-Voll (formerly Norwaysays), while spent in autumn with studio Stefan Diez in Munich, Germany.

EDUCATION

- 2012** - Masters of Art in Furniture design, Aalto University
School of Arts, Design and Architecture
- 2007** - Bachelor of Industrial Design, Faculty of Architecture,
King Mongkut's Institute of Technology Ladkrabang,
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AWARDS

- 2012** - Honourable mention, FDA Singapore
Short list Designboom
- 2010** - Scholar design student, selected by office of The Civil
Service Commission, Royal Thai Government
- 2008** - Award winner – Superware Design Award 2009
by Srithai Superware, Thailand
- Young Designer Of The Year 2008, Thailand
- Honorable Mention – Thailand Gift Design Award
(Professional Level), selected by Ministry of Commerce
- Innovation Design Award, selected by Innovation
National Agency, Ministry of Science and Technology,
Thailand
- Out Standing Design Award, selected by Thailand
International Furniture Fair
- Young Designer Award – Interior Life Style, Tokyo, Japan
- 2006** Award winner - 10 Modernform Kitchen design Contest,
Modernform company, Thailand

WORKING EXPERIENCE

- 2011** - Designer Studio Stefan Diez Munich, Germany
- Designer for Anderssen-Voll(Formerly Norwaysays)
Oslo, Norway
- 2010** - Guest designer for Modernform Co.,Ltd, Thailand
- 2007** - Designer for Kenkoon Company Limited.,Ltd, Thailand
- Designer for Moban (Modern Outdoor Company),
Thailand
- Researcher and Designer of Pineapple Paper Project by
YOTHAKA International Co.,Ltd (Bachelor Thesis).
- Designer for Yothaka International Co.,Ltd , Thailand
- 2006** - Designer for YENN Design Studio, Thailand
- Internship with YOTHAKA International Co.,Ltd.
- 2004** - Internship with ONER Industrial design Co.,Ltd.

WORKSHOP & EXHIBITIONS

- 2011**
- Tokyo Design week, in collaboration with Aalto university, Tokyo, Japan
 - Stockholm Furniture Fair, green house area, in collaboration with Aalto university, Stockholm, Sweden
- 2009**
- Salone de mobile 2009, in collaboration with Kenkoon Company in, Milan, Italy
 - Visual Education, Ambiente Fair 2009, Frankfurt, Germany
 - 'Japan Design skill Program : Volumn 2-3' Work Shop Project, Tokyo, Japan
 - Thailand International Furniture fair 2009, Impact Arena, Bangkok, Thailand.
- 2008**
- 100 % Design, London, United Kingdom in collaboration with Moban
 - Japan Design skill Program : Volumn 1' Work Shop Project, Bangkok, Thailand.
 - Thailand International Furniture fair 2008, Impact Arena, Bangkok, Thailand.
 - Thailand Big&Bih Fair 2008, Impact Arena, Bangkok, Thailand.
 - Ambiente (Young Talent), Frankfurt, Germany
- 2007**
- 'Future Natural' Work Shop Project, Department of Export
 - Promotion, for TIFF 2008 (Thailand International Furniture Fair 2008)
 - Interior Life Style(Young Talent), Tokyo, Japan.
 - Thailand International Furniture Fair (TIFF 2007), Designer for Design2Product Project,
 - Department of Export Promotion, Ministry of science Technology and environment
- 2006**
- Visual Education, NEON Tokyo Interior LifeStyle, Organizer Member, Tokyo, Japan.





